



EXPRESS MAIL NO. EV449559330US

Sheet 1 of 5

FORM PTO-1449  
(REV.7-80)

U.S. DEPARTMENT OF COMMERCE  
PATENT AND TRADEMARK OFFICE

INFORMATION DISCLOSURE STATEMENT  
(Use several sheets if necessary)

ATTY. DOCKET NO.  
690116.401C1

APPLICATION NO.  
10/810,486

APPLICANT  
Mitsuru Furusawa

FILING DATE  
March 26, 2004

GROUP ART UNIT  
1642 1633

### U.S. PATENT DOCUMENTS

*EXAMINER INITIAL		DOCUMENT NUMBER	DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA						

### FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION
	AB				YES NO

### OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

MB	AC	Aoki, K. et al., "Promotion of Evolution by Intracellular Coexistence of Mutator and Normal DNA Polymerases," <i>J. Theor. Biol.</i> 209:213-222, 2001.
MB	AD	Araki, H. et al., "Cloning DPB3, the Gene Encoding the Third Subunit of DNA Polymerase II of <i>Saccharomyces Cerevisiae</i> ," <i>Nucleic Acids Research</i> 19(18):4867-4872, 1991.
MB	AE	Boulet, A. et al., "Structure and Function of the <i>Saccharomyces Cerevisiae</i> CDC2 Gene Encoding the Large Subunit of DNA Polymerase III," <i>The EMBO Journal</i> 8(6):1849-1854, 1989.
MB	AF	Doi, H. et al., "Evolution is Promoted by Asymmetrical Mutations in DNA Replication – Genetic Algorithm with Double-Stranded DNA - , " <i>Fujitsu Sci. Tech.</i> 32(2):248-255, December 1996.
MB	AG	Eigen, M., "Selforganization of Matter and the Evolution of Biological Macromolecules," <i>Die Naturwissenschaften</i> 58:465-523, 1971.
MB	AH	Eigen, M., "The Hypercycle. A Principle of Natural Self-Organization," <i>Die Naturwissenschaften</i> 64:541-565, 1977.
MB	AI	Eshleman, J. et al., "Increased Mutation Rate at the <i>hprt</i> Locus Accompanies Microsatellite Instability in Colon Cancer," <i>Oncogene</i> 10:33-37, 1995.
MB	AJ	Fancino, P. et al., "Asymmetries Generated by Transcription-Coupled Repair in Enterobacterial Genes," <i>Science</i> 272:107-112, 1996.
MB	AK	Furusawa, M. et al., "Promotion of Evolution: Disparity in the Frequency of Strand-Specific Misreading Between the Lagging and Leading DNA Strands Enhances Disproportionate Accumulation of Mutations," <i>J. Theor. Biol.</i> 157:127-133, 1992.
MB	AL	Furusawa, M. et al., "Asymmetrical DNA Replication Promotes Evolution: Disparity Theory of Evolution," <i>Genetica</i> 102/103:333-347, 1998.

EXAMINER /Michael Burkhart/ DATE CONSIDERED 08/18/2006

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## U.S. PATENT DOCUMENTS

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	BA						

## FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	DATE	COUNTRY	TRANSLATION
					YES NO
	BB				

## OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

MB	BC	Fijalkowska, I. et al., "Unequal Fidelity of Leading Strand and Lagging Strand DNA Replication on the <i>Escherichia Coli</i> Chromosome," <i>Proc. Natl. Acad. Sci. USA</i> 95:10020-10025, August 1998.
MB	BD	Gawel, D. et al., "Asymmetry of Frameshift Mutagenesis During Leading and Lagging-Strand Replication in <i>Escherichia Coli</i> ," <i>Mutation Research</i> 501:129-136, 2002.
MB	BE	Goldsby, R. et al., "High Incidence of Epithelial Cancers in Mice Deficient for DNA Polymerase $\delta$ Proofreading," <i>Proc. Natl. Acad. Sci.</i> 99(24):15560-15565, November 2002.
MB	BF	Iwaki, T. et al., "Preferential Replication-Dependent Mutagenesis in the Lagging DNA Strand in <i>Escherichia Coli</i> ," <i>Mol. Gen. Genet.</i> 251:657-664, 1996.
MB	BG	Kang, S. et al., "Expansion and Deletion of CTG Repeats from Human Disease Genes are Determined by the Direction of Replication in <i>E. Coli</i> ," <i>Nature Genetics</i> 10, 213-218, June 1995.
MB	BH	Kunkel, T. et al., "Exonucleolytic Proofreading by Calf Thymus DNA Polymerase $\delta$ ," <i>Proc. Natl. Acad. Sci. USA</i> 84:4865-4869, July 1987.
MB	BI	Maliszewska-Tkaczek, M. et al., "SOS Mutator Activity: Unequal Mutagenesis on Leading and Lagging Strands," <i>Proc. Natl. Acad. Sci. USA</i> 97(23):12678-12683, November 2000.
MB	BJ	Morrison, A. et al., "The 3'→5' Exonucleases of Both DNA Polymerase $\delta$ and $\epsilon$ Participate in Correcting Errors of DNA Replication in <i>Saccharomyces Cerevisiae</i> ," <i>Mol. Gen. Genet.</i> 242:289-296, 1994.
MB	BK	Morrison, A. et al., "A Third Essential DNA Polymerase in <i>S. Cerevisiae</i> ," <i>Cell</i> 62:1143-1151, September 1990.
MB	BL	Ohya, T. et al., "Structure and Function of the Fourth Subunit(Dpb4p) of DNA Polymerase $\epsilon$ in <i>Saccharomyces Cerevisiae</i> ," <i>Nucleic Acids Research</i> 28(20):3846-3852, 2000.

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	CB				YES NO

## OTHER PRIOR ART (Including Author, Title, Date, Pertinent Pages, Etc.)

MB	CC	Roberts, J. et al., "Fidelity of a Human Cell DNA Replication Complex," <i>Proc. Natl. Acad. Sci. USA</i> 85:7064-7068, October 1988.
MB	CD	Robert, J. et al., "Frameshift Fidelity During Replication of Double-Stranded DNA in HeLa Cell Extracts," <i>Biochemistry</i> 32:4083-4089, 1993.
MB	CE	Robert, J. et al., "Exonucleolytic Proofreading of Leading and Lagging Strand DNA Replication Errors," <i>Proc. Natl. Acad. Sci. USA</i> 88:3465-3469, April 1991.
MB	CF	Robert, J. et al., "Mispair-, Site-, and Strand-Specific Error Rates During Simian Virus 40 Origin-Dependent Replication <i>in Vitro</i> with Excess Deoxythymidine Triphosphate," <i>The Journal of Biological Chemistry</i> 269(3):1711-1717, January 1994.
MB	CG	Rosche, W. et al., "Differential DNA Secondary Structure-Mediated Deletion Mutation in the Leading and Lagging Strands," <i>Journal of Bacteriology</i> 177(15):4385-4391, August 1995.
MB	CH	Tanabe, K. et al., "A Conspicuous Adaptability to Antibiotics in the Escherichia Coli Mutator Strain, <i>DNAQ49</i> ," <i>FEMS Microbiology Letters</i> 176:191-196, 1999.
MB	CI	Trinh, T. et al., "Preferential DNA Secondary Structure Mutagenesis in the Lagging Strand of Replication in E. Coli," <i>Nature</i> 352:544-547, August 1991.
MB	CJ	Veaute, X. et al., "Greater Susceptibility to Mutations in Lagging Strand of DNA Replication in <i>Escherichia Coli</i> than in Leading Strand," <i>Science</i> 261:598-600, July 1993.
MB	CK	Wada, K-N. et al., "A Neo-Darwinian Algorithm: Asymmetrical Mutations due to Semiconservative DNA-Type Replication Promote Evolution," <i>Proc. Natl. Acad. Sci. USA</i> 90:11934-11938, December 1993.
MB	CL	Weston-Hafer, K. et al., "Deletions in Plasmid pBR322: Replication Slippage Involving Leading and Lagging Strands," <i>Genetics</i> 127:649-655, April 1991.

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**FOREIGN PATENT DOCUMENTS**

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					YES	NO
MB	DE	08-163986	06/25/96	JP (+ Abstract in English)		
MB	DF	08-163987	06/25/96	JP (+ Abstract in English)		
MB	DG	09-023882	01/28/97	JP (+ Abstract in English)		
MB	DH	WO 00/28015	05/18/00	WIPO		
MB	DI	1 054 057 A1	11/22/00	EP		

**OTHER PRIOR ART** (Including Author, Title, Date, Pertinent Pages, Etc.)

MB	DJ	Wu, C-I. et al., "Inequality in Mutation Rates of the Two Strands of DNA," <i>Nature</i> 327:169-170, May 1987.
	DK	Furusawa, M., <i>Iden</i> , pp. 148-158, July 1996.
	DL	Furusawa, M., <i>Iden</i> 8:92-96, March 2001.
	DM	Furusawa, M., "Asymmetrical DNA Replication Promotes Evolution," <i>Pathological Physiology</i> 14:675-681, September 1995.
	DN	Furusawa, M., <i>KAST Report</i> 7(1):20-25, 1995.
	DO	Furusawa, M., <i>BioHistory</i> , pp. 012-013, November 2001.
	DP	Furusawa, M., Chemistry and Biology 34(2):78-79, 1996.
MB	DQ	Barnes, M., et al., "Localization of the Exonuclease and Polymerase Domains of <i>Bacillus subtilis</i> DNA Polymerase III," <i>Gene</i> 111:43-49, 1992.
MB	DR	Horst, J-P., et al., "Escherichia coli Mutator Genes," <i>Trends in Microbiology</i> 7(1):29-36, January 1999.
	DS	Maki, H., "Natural Mutation and Repair Mechanism," <i>Cell Engineering</i> 13(8):663-672, 1994.

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					YES	NO
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	EN					
	EO					

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MB	EP	Morrison, A., et al., "Pathway Correcting DNA Replication Errors in <i>Saccharomyces cerevisiae</i> ," <i>EMBO J.</i> 12(4):1467-73, April 1993.
MB	EQ	Stemmer, W., "Rapid Evolution of a Protein in <i>vitro</i> by DNA Shuffling," <i>Nature</i> 370(6488):389-91, August 4, 1994.
	ER	

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